

REMARKS

Claims 1-21 and 23-57 are pending. Claims 1, 13, 20, 27, 23, 24, 29, 34, and 36 have been amended, claim 22 has been canceled, and new claims 41-57 have been added to recite additional features of Applicants' invention. These amendments correct typographical error forming the basis of the objection to claim 24, and the specification has been amended to also correct typographical errors.

Reconsideration of the application is respectfully requested for the following reasons.

In the Office Action, the Examiner rejected claims 1-40 under 35 USC § 103(a) for being obvious based on a combination of the Yi and Kondo patents. This rejection is respectfully traversed for the following reasons.

Claim 1 recites a comparator that judges which one of the colors corresponding to RGB values has a comparatively greater specific gravity, and a shifter that "shifts each of the 8-bit RGB values in order to allocate at least one extra bit to the color having the comparatively greater specific gravity." The cited references do not teach or suggest a shifter of this type.

The Yi patent discloses a method for processing 24-bit digital video data using a bit-length compression technique. The Yi patent, however, does not teach or suggest the comparator of claim 1, or a shifter that shifts RGB values based on which color has a comparatively greater specific gravity. (See page 3 of the Office Action). To make up for these deficiencies, the Kondo patent was cited.

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The Kondo patent discloses a method for compressing digital video data. As shown in Fig. 2, this method includes computing an absolute value of the difference in RGB data for one pixel and the RGB data for an adjacent pixel. (S102). Bit compression is then performed based on which color has the greater absolute value. (S103). The type of compression performed by Kondo, however, is different from the compression performed by the shifter of claim 1 in at least two ways.

First Difference

The claimed shifter “shifts each of the 8-bit RGB values in order to allocate at least one extra bit to the color having the comparatively greater specific gravity.” (Emphasis added). That is, the shifter of claim 1 shifts all the RGB values from 8-bit values to values different from 8-bits. These features are shown, for example, in the non-limiting embodiment of Fig. 4, where the shifter shifts an 8-bit R value to a 6-bit value and shifts 8-bit G and B values to 5-bit values.

However, in Kondo, bit compression is not performed for all RGB values. In contrast to the claimed invention, the only RGB value that is shifted is the one that has the greater absolute value. More specifically, referring to Fig. 2, the Kondo bit-compressor receives 8-bit RGB values for a pixel in an image. It compares these values to adjacent values, and then takes an absolute difference. (S102). The RGB value corresponding to the color having the greater absolute difference gets shifted to a less-than-8-bit value, but the values corresponding to the other two colors are not shifted, e.g., they remain 8-bit values. (See column 5, line 13 - column 6, line 3 with reference to Figure 2).

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Thus, the bit-compression performed by Kondo guarantees that at least two of the three RGB values remain unshifted 8-bit values. To further illustrate, if the color green has the greater absolute value for a given pixel, then the RGB data for that pixel will be stored as R = 8-bit value, G = 7-bit value, B = 8-bit value. (See S105).

The claimed shifter, however, guarantees that all three RGB values will be shifted so that all three colors are allocated a number of bits different from 8. In a preferred embodiment, all three shifted color values are less than 8 bits, which promotes improvements in data storage capacity. The bit-compressor of Kondo does not perform this function.

Second Difference

The claimed shifter shifts the 8-bit RGB values “in order to allocate at least one extra bit to the color having the comparatively greater specific gravity.” (Emphasis added). The Kondo bit-compressor does not perform this function either. In fact, the Kondo compressor performs the opposite function.

In the Kondo method, only the RGB value corresponding to the color having the greatest absolute value is shifted to a lower value. The other two color values remain 8-bit values. The Kondo compression technique, therefore, ensures that the color having the greatest absolute value (or maximum color value as identified by the Examiner) will have at least one less bit than the other two colors. Thus, if green has the larger absolute value, green will be compressed from 8-bits to 7-bits and red and blue will remain at 8-bits, which is exactly the

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opposite form of compression performed by the claimed shifter.

Incidentally, Fig. 3 of Kondo shows that a red compressed value has 6 bits, a green compressed value has 7 bits, and a blue compressed value has 6 bits. But, these compressed bits do not simultaneously exist together. Rather, Fig. 3 is provided only to show the identification code that precedes the compressed bits, but only one of the colors is compressed for any given pixel. The uncompressed colors remain 8-bit values.

For at least the foregoing reasons, it is respectfully submitted that claim 1 and its dependent claims are non-obvious and thus patentable over a Yi-Kondo combination.

Dependent claims 5, 6, 8, 9, 11, and 12 recite that all the RGB values are shifted to less than 8-bits, which is different from the form of compression performed in Kondo. Accordingly, it is submitted that these dependent claims are allowable, not only by virtue of their dependency from claim 1 but also based on the features separately recited therein.

New claims 41-44 further define the apparatus of claim 1.

Claim 41 recites that "the shifter shifts the RGB values to allocate a **same number** of extra bits **irrespective of which one of the colors is judged to have the greater specific gravity.**" (Emphasis added). The Yi and Kondo patents do not teach or suggest these features. The Yi patent does not have a shifter which shifts RGB values based on specific gravity comparisons. And, Kondo allocates different numbers of (6 or 7) bits to different RGB values based on which color has the greater absolute value. The claimed invention, however, shifts the RGB values to a same number of bits (e.g., 6 bits) regardless of whether the R, G, or B color has

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the greater specific gravity. Based on these differences, it is respectfully submitted that claim 41 is allowable over the cited combination.

Claim 42 recites that the comparator “determines a scale position for each of the RGB values, compares the scale positions of the RGB values, and judges which one of the RGB values has the greater specific gravity based on a result of the comparison of scale positions.” The cited references do not teach or suggest these features. In terms of Kondo, in contrast to the claimed invention, this patent discloses comparing absolute values of the differences between the RGB values of one pixel and the RGB values of an adjacent pixel. In contrast, claim 42 defines an invention where the scale positions within a single pixel are compared to one another for purposes of determining shifting.

Claim 43 recites that “the comparator selects an RGB value having the largest scale position as the one having the greater specific gravity.” The cited references do not teach or suggest these features.

Claim 44 recites that “the scale positions are equivalent grayscale positions for a respective one of the RGB colors.” The cited references do not teach or suggest these features.

The other sets of claims are also distinguishable from the cited combination.

Claim 13 recites an image converting method which includes “judging which of the RGB colors in the color image has a comparatively greater specific gravity” and then “generating second RGB color values from the first RGB color values, said generating step including allocating at least one extra bit to the color having the comparatively greater specific gravity.

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These features are not taught or suggested by the Yi and Kondo patents, whether taken alone or in combination. Based on these differences, it is respectfully submitted that claim 13 and its dependent claims are allowable.

Claim 20 recites that the converting step includes “converting an M bit-size image into an N bit-size image wherein $M > N$, said converting including for each pixel in the M bit-size image (a) generating first RGB values, (b) determining which of the first RGB values has a greater specific gravity, (c) converting the first RGB values into second RGB values each with lesser bit size, the second RGB value with the greater specific gravity allocated with at least one extra bit than the remaining second RGB values, and (d) combining the second RGB values to form the N bit-size image.” The cited references do not teach or suggest these features. For at least these reasons, it is respectfully submitted that claim 20 and its dependent claims are allowable.

Claim 27 recites “converting the first RGB values into second RGB color values based on the color with the greater specific gravity, the second RGB values having different numbers of bits than the first RGB values respectively.” The cited references do not teach or suggest these features. For at least these reasons, it is respectfully submitted that claim 20 and its dependent claims are allowable.

Claim 34 recites a converter which “converts the first RGB values into second RGB color values based on the color with the greater specific gravity.” The Kondo patent does not convert all of its RGB values. Rather, it only converts the RGB value having the greater absolute

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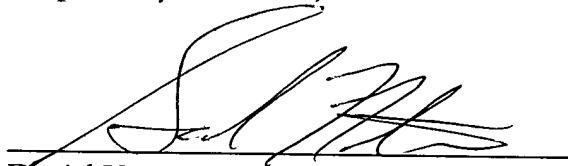
value than the others. Thus, claim 34 and its dependent claims are patentably distinguishable from Kondo, taken alone or in combination with Yi.

New claims 45-57 further define the inventions defined in independent claims 13, 20, 27, and 34. The cited references do not teach or suggest the features in these new claims.

In view of the foregoing amendments and remarks, it is respectfully submitted that the application is in condition for allowance. Favorable consideration and prompt allowance of the application is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 CFR § 1.136. Please charge any shortage in fees due in connection with this application to Deposit Account No. 16-0607 and credit any excess fees to the same Deposit Account.

Respectfully submitted,



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Date: May 10, 2005

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